CLAIMS

I claim:

1. A system for automatic optimization of orders of multiple items from multiple sources, which takes into account at least the item prices and the shipment prices, and generates at least one acceptable or near-optimal offer, comprising:
    a. At least one of: 1. At least one server capable of searching multiple vendor sites for prices and other relevant data or capable of obtaining the results from one or more such servers; and 2. A program running on the user's computer, capable of searching multiple vendors sites for prices and other relevant data or capable of obtaining the results from one or more said servers;
    b. At least one of: 1. A server capable of executing the computations needed for finding said at least one acceptable offer; 2. A server capable of using at least partially the computation power of the user's own computer for executing said computations; and 3. A program on the user's computer capable of executing said optimizations.

2. The System of claim 1 wherein said at least one acceptable or near-optimal offer is defined by being within an acceptable maximum deviation from at least one lower boundary or theoretical optimum, and said lower boundary is determined by at least one of:
    a. Taking the lowest price available for each item and the shipment price if all of the items were available from the shop with the lowest shipment prices.
    b. Other heuristic estimates.

3. The system of claim 2 wherein said maximum allowed deviation is determined by at least one of the system and the user and according to at least one of:

a. The distance between the lower bound and the upper bound.
b. Automatic adjustment according to the time limit set by the user.
c. Automatic adjustment according to progress over time.
d. Statistics of similar past cases and/or statistics and/or parameters and/or characteristics of the current case.
e. Other heuristics.
f. The user's response to the deviation recommended by the system.
g. If the results have been obtained after too little time the system tries again with a lower deviation.

4. The system of claim 1 wherein at least one of the following features exists:
   a. Said system is based on results from price comparison metasearch from multiple online vendors or shops.
   b. Apart from said shops the system uses and integrates also results from at least one of: Auction sites, liquidations sites, and second hand shops.
   c. Based one or more criteria the system can decide automatically when to order at least some of the items directly from the manufacturer or from the distributor instead of from any of the vendors.
   d. Based one or more criteria the system can decide automatically when to offer the user aggregation services, so that at least some of the items purchased from more then one vendor are sent to at least one intermediary place and shipped from there together to the user.
   e. The system tries to aggregate multiple orders also across users if more than one user is trying to order items from the same vendors within a reasonable time window, so that at least one of: Additional reductions for quantities can be obtained and additional shipping costs can be saved between the shop and the aggregation place.

5. The system of claim 4 wherein said criteria for deciding if to order at least some of the items directly from the manufacturer or from the distributor include at least one of:
    a. The average margin of profit that the vendors are making on the item;
    b. The average margin of profit that the cheapest vendors are making on the item;
    c. The terms for ordering directly from the manufacturer or distributor and/or for obtaining reduction for quantities;
    d. The number of items that the user is ordering that can be obtained from the same manufacturer or distributor;
    e. The number of items that can be aggregated for ordering multiple items from the same manufacture or distributor from multiple users within an acceptable time window.

6. The system of claim 4 wherein said criteria for deciding when to offer the user aggregation services include at least one of:
    a. The difference in shipment prices between local orders and international orders;
    b. The unavailability of international orders from at least one of the selected vendors;
    c. The existence of shipment policies in at least one of the vendors that makes aggregation more reasonable;
    d. The amount of delay that the aggregation will cause and the degree of urgency specified by the user.

7. The system of claim 1 wherein the system takes into consideration also at least one of:
    a. The urgency as defined by the user for at least one of: each item, each sub-groups of items, and the entire group of items.

b. Rules for preferring and/or avoiding certain vendors which are at least one of: absolute, or dependant on at least one condition that relates to the order.
c. Any coupons or bonuses or credits that the user has at one or more of the vendors.
d. Readiness to buy at least one of: 2nd hand items, refurbished items, items from auctions, items from liquidations, and eBooks instead of hard-copy books.
e. Conditions for buying at least one of: 2nd hand items, refurbished items, items from auctions, items from liquidations, and eBooks instead of hard-copy books.

8. The system of claim 1 wherein after getting the at least one acceptable or near-optimal offer, the user can either make the order automatically through the meta-search site, or purchase the grouped items directly at the recommended stores, if he so prefers.

9. The system of claim 1 wherein the user can indicate that he wants to go personally to pick the items from shops that are close enough to him, by at least one of indicating the specific shops and indicating the acceptable distance, and the system can take that into consideration when computing the optimizations.

10. The system of claim 2 wherein the user can specify at least one of:
    a. The maximum deviation from said lower bound or theoretical optimum.
    b. One or more Maximum search time limits.
    c. Rules for automatically changing the maximum allowed deviation according to results after one or more time checkpoints.

11. The system of claim 1 wherein at least one of the following features exists:
    a. The system can save various such user preferences in its own database and/or on the user's own computer for future searches, so that these preferences can be used as defaults the next time the users uses the system, unless he changes them.
    b. The system can save various such user preferences in its own database and/or on the user's own computer for future searches, so that these preferences can be used as defaults the next time the users uses the system, and these defaults are shown to the user the next time he enters the system, and he is invited to make any changes if he wishes.
    c. The system makes sure that the items requested for an optimization run belong to the same category.
    d. The system can search for the user for more than one possible set of preferences and at least one of: let the user compare the results, compare them for him, and automatically choose the preferred set according to the results and to rules specified by the user.

12. The system of claim 2 wherein at least one of the following features exists:
    a. The single-item search results and any other needed data are transferred to the user's computer so that at least part of the optimization it is computed on the user's computer.
    b. The single-item search results and any other needed data are transferred to the user's computer so that at least part of the optimization it is computed on the user's computer, and said computation is done on the user's computer by using at least one of: Java, Javascript, ActiveX, other portable code, and letting the user install a special software for this the first time he uses the site.
    c. The server can automatically choose if to make the computation itself or to transfer it to the user's computer, according to at least one of: The number of items, the number of relevant vendors, the estimated

complexity, the time limit that the user agrees to, the current load on the server, and the maximum allowed deviation that the user agrees to.

d. If the user's computer is used for at least part of the computation, at least some of the data is transferred to the program that runs on the user's computer in an encrypted form, and/or the actual vendor identities are not transferred to the user's compute.

13. The system of claim 4 wherein the aggregation services are enabled by at least one of:
    a. The system uses at least one of {Intermediary sites, warehouses, and mail forwarding services}, which are at least one of: branches of the site that runs the system, owned by the site, pay some commission to it, or have other deals with it.
    b. The system works with shipping companies with which it has deals, so that the shipping company itself gives a reduced price to the user based on the fact that the items are collected for shipping together to the same address.

14. The system of claim 1 wherein the system can automatically negotiate a better deal with at least some of the suppliers and/or make reductions automatically according to pre-agreed rules with those vendors.

15. The system of claim 14 wherein at least one of the following features exists:
    a. Said automatic negotiations or automatic reductions are performed at least one of: During the optimization process, and After one or more acceptable solutions have been generated.
    b. Said pre-agreed rules are based on at least one of: 1. Maximum percent or absolute reduction allowed for an entire order, depending at least on the total order amount and/or on the number of items bought, 2. Maximum percent or absolute money reduction defined separately

for each item and/or for each group of items, and 3. Maximum reductions in response to reductions available from other vendors.

c. If one or more reductions from normal listed prices were made, the user can use the reductions by at least one of: 1. If the system relays the relevant parts of the order automatically to the relevant suppliers, then it uses agreed codes to make the sites accept the reduced prices, 2. If the user prefers to make the order directly from one or more of the selected sites, then the system provides the user with the relevant codes.

16. The system of claim 8 wherein the transfer of orders from the system's site to the individual vendors can be done by at least one of:
    a. Keeping a user profile and accessing automatically a shopping cart on behalf of the user on the individual vendor's site.
    b. Billing the user directly and accessing the vendor's shopping cart with the system's site's billing info.
    c. Through one or more special agreed protocols for faster transferring of orders from the system's site to the vendor without having to waste time on emulating a user clicking on various options or building up a shopping cart and checking out
    d. Giving the vendor at least one of: the user's address, the system's address, and the address of an intermediary needed for aggregation.

17. The system claim 2 wherein if an acceptable result is not achieved within the specified time limit, then at least one of:
    a. The system shows the user the current deviation and asks him if he wants to continue the attempts for additional time and/or to increase the maximum allowed deviation and try again, or to accept the result

b. The system decides automatically or recommends to the user if to continue the attempts for additional time and/or to increase the maximum allowed deviation and try again, or to accept the result.

c. The system's decision is based on at least one of: The step in the calculation where the time limit has interrupted the process, the distance from the maximum allowed deviation and/or from the lower bound and/or from the upper bound, the number of times the time limit has already been extended, the total time already spent on the calculation, and other statistics and/or heuristics.

18. The system of claim 2 wherein for the actual optimization the system uses at least one of the following steps or methods:

a. The system checks if there are bigger differences in the item prices or in the shipment prices, in order to decide which heuristics to prefer.

b. If there are bigger differences in the item prices, the system starts by finding the item on which there is the biggest price difference, and starts from the shop or supplier that sells that item.

c. The system tries to add to the potential order from the chosen supplier additional requested items ordered by the least difference from the cheapest price on that item from any of the suppliers. The process adds items from this shop, using the least percent difference criteria and/or least absolute difference criteria, as long as the deviation remains less than the maximum desired deviation or no more items on the user's list are available at the site, or until the list of items has ended.

d. If no more items could be added to the potential order from the chosen shop since the total price would deviate from the lower bound by more than the desired maximum deviation and/or not all items are available from that shop, then the system conducts the same process for adding

one or more suppliers for the remaining items, again choosing an item not already chosen with the largest price difference (as above).

e. If any of the suppliers next included has any of the items at a cheaper price than another shop that is already included in the potential order, then the system removes that item from the shop where it is more expensive and adds it to the potential order from the shop where it is cheaper.

f. If the difference in items prices are smaller and the differences in shipments prices are bigger, the system can decide to start the optimization by choosing the shop that has the largest number of the requested items available and/or the shop with the cheapest shipment prices. If all the items are available from that shop and the total price is within the desired maximum deviation then the offer can be shown to the user, otherwise the system tries to add the missing items by adding one or more shops to the potential order.

g. The system tries a comprehensive computation in case all items are bought from 1 shop or divided only between 2 or at most 3 shop and only then reverts to the other heuristics, if still needed

h. The system decides in advance by analysis of the differences in shipment prices compared to the differences in item prices (based on at least one of the range, variance, and/or other statistics or characteristics), between how many vendors at most the items should be divided.

i. The system uses various heuristics in advance and/or during the computation to rule out from the computation any vendors who would be unreasonable even to check since clearly they will not be able to fit within the acceptable deviation or would violate some other condition.

j. The system decides which heuristics to use depending on various parameters and/or statistics.

k. At each step before deciding which shop to add next to the potential order, the system checks for the remaining items if the differences are bigger in item prices or in shipment prices and proceeds according to the answer.
l. The system always tries first to start from the cheapest item.
m. The system always tries to start from the shop that has the largest number of items and is also the cheapest by one or more criteria.
n. The system uses other heuristics which are based on defining an allowed deviation or deviations from one or more types of theoretical optimum.
o. The system uses column generation heuristics.
p. The system uses other known methods for obtaining near-optimal or acceptable solutions.

19. The system of claim 2 wherein when showing the results the system shows the user also at least one of:
    a. A summary of how close a given offer is to at least one of the lower bound and the upper bound.
    b. An estimate of how close a given offer it is to the actual optimum.
    c. More than one acceptable offer, so that the user can chose among alternatives according to at least one of: The effect of the speed of shipment on the price, The effect of buying an eBook instead of a printed book, The effect of buying 2nd hand items, The affect of using the aggregation, The effect of using the preferred vendors or not, and Other criteria.

20. The system of claim 1 wherein the user can request that the system will notify him automatically when at least one of: a. One or more items become available at a certain price or below, an out-of stock items becomes available again, c. Some other condition becomes fulfilled.

21. The system of claim 20 wherein in order to find out when the conditions have been fulfilled, the system keeps a list of such requests and of the users who requested them, and then the system can find out when any of these items become available at the requested prices and/or other conditions become fulfilled by at least one of the following ways:
    a. Running periodically special checks for the requested items.
    b. Checking for the relevant items or conditions while updating periodically the prices.
    c. Noticing the relevant items whenever they come up in metasearches conducted by any users.

22. A method for automatic optimization of orders of multiple items from multiple sources, which takes into account at least the item prices and the shipment prices, and generates at least one acceptable or near-optimal offer, comprising the steps of:
    a. Using at least one of: 1. At least one server capable of searching multiple vendor sites for prices and other relevant data or capable of obtaining the results from one or more such servers; and 2. A program running on the user's computer, capable of searching multiple vendors sites for prices and other relevant data or capable of obtaining the results from one or more said servers;
    b. Using at least one of: 1. A server capable of executing the computations needed for finding said at least one acceptable offer; 2. A server capable of using at least partially the computation power of the user's own computer for executing said computations; and 3. A program on the user's computer capable of executing said optimizations.

23. The Method of claim 22 wherein said at least one acceptable or near-optimal offer is defined by being within an acceptable maximum deviation from at

least one lower boundary or theoretical optimum, and said lower boundary is determined by at least one of:

a. Taking the lowest price available for each item and the shipment price if all of the items were available from the shop with the lowest shipment prices.
b. Other heuristic estimates.

24. The method of claim 23 wherein said maximum allowed deviation is determined by at least one of the system and the user and according to at least one of:

a. The distance between the lower bound and the upper bound.
b. Automatic adjustment according to the time limit set by the user.
c. Automatic adjustment according to progress over time.
d. Statistics of similar past cases and/or statistics and/or parameters and/or characteristics of the current case.
e. Other heuristics.
f. The user's response to the deviation recommended by the system.
g. If the results have been obtained after too little time the system tries again with a lower deviation.

25. The method of claim 22 wherein at least one of the following features exists:
a. Said method is based on results from price comparison metasearch from multiple online vendors or shops.
b. Apart from said shops the system uses and integrates also results from at least one of: Auction sites, liquidations sites, and second hand shops.
c. Based one or more criteria the system can decide automatically when to order at least some of the items directly from the manufacturer or from the distributor instead of from any of the vendors.

d. Based one or more criteria the system can decide automatically when to offer the user aggregation services, so that at least some of the items purchased from more then one vendor are sent to at least one intermediary place and shipped from there together to the user.
e. The system tries to aggregate multiple orders also across users if more than one user is trying to order items from the same vendors within a reasonable time window, so that at least one of: Additional reductions for quantities can be obtained and additional shipping costs can be saved between the shop and the aggregation place.

26. The method of claim 25 wherein said criteria for deciding if to order at least some of the items directly from the manufacturer or from the distributor include at least one of:
    a. The average margin of profit that the vendors are making on the item;
    b. The average margin of profit that the cheapest vendors are making on the item;
    c. The terms for ordering directly from the manufacturer or distributor and/or for obtaining reduction for quantities;
    d. The number of items that the user is ordering that can be obtained from the same manufacturer or distributor;
    e. The number of items that can be aggregated for ordering multiple items from the same manufacture or distributor from multiple users within an acceptable time window.

27. The method of claim 25 wherein said criteria for deciding when to offer the user aggregation services include at least one of:
    a. The difference in shipment prices between local orders and international orders;

b. The unavailability of international orders from at least one of the selected vendors;
c. The existence of shipment policies in at least one of the vendors that makes aggregation more reasonable;
d. The amount of delay that the aggregation will cause and the degree of urgency specified by the user.

28. The method of claim 22 wherein the method takes into consideration also at least one of:
    a. The urgency as defined by the user for at least one of: each item, each sub-groups of items, and the entire group of items.

    b. Rules for preferring and/or avoiding certain vendors which are at least one of: absolute, or dependant on at least one condition that relates to the order.
    c. Any coupons or bonuses or credits that the user has at one or more of the vendors.
    d. Readiness to buy at least one of: 2nd hand items, refurbished items, items from auctions, items from liquidations, and eBooks instead of hard-copy books.
    e. Conditions for buying at least one of: 2nd hand items, refurbished items, items from auctions, items from liquidations, and eBooks instead of hard-copy books.

29. The method of claim 22 wherein after getting the at least one acceptable or near-optimal offer, the user can either make the order automatically through the meta-search site, or purchase the grouped items directly at the recommended stores, if he so prefers.

30. The method of claim 22 wherein the user can indicate that he wants to go personally to pick the items from shops that are close enough to him, by at least one of indicating the specific shops and indicating the acceptable

distance, and the system can take that into consideration when computing the optimizations.

31. The method of claim 23 wherein the user can specify at least one of:
    a. The maximum deviation from said lower bound or theoretical optimum.
    b. One or more Maximum search time limits.
    c. Rules for automatically changing the maximum allowed deviation according to results after one or more time checkpoints.

32. The method of claim 22 wherein at least one of the following features exists:
    a. The system can save various such user preferences in its own database and/or on the user's own computer for future searches, so that these preferences can be used as defaults the next time the users uses the system, unless he changes them.
    b. The system can save various such user preferences in its own database and/or on the user's own computer for future searches, so that these preferences can be used as defaults the next time the users uses the system, and these defaults are shown to the user the next time he enters the system, and he is invited to make any changes if he wishes.
    c. The system makes sure that the items requested for an optimization run belong to the same category.
    d. The system can search for the user for more than one possible set of preferences and at least one of: let the user compare the results, compare them for him, and automatically choose the preferred set according to the results and to rules specified by the user.

33. The method of claim 23 wherein at least one of the following features exists:
    a. The single-item search results and any other needed data are transferred to the user's computer so that at least part of the optimization it is computed on the user's computer.
    b. The single-item search results and any other needed data are transferred to the user's computer so that at least part of the optimization it is computed on the user's computer, and said computation is done on the user's computer by using at least one of: Java, Javascript, ActiveX, other portable code, and letting the user install a special software for this the first time he uses the site.
    c. The server can automatically choose if to make the computation itself or to transfer it to the user's computer, according to at least one of: The number of items, the number of relevant vendors, the estimated complexity, the time limit that the user agrees to, the current load on the server, and the maximum allowed deviation that the user agrees to.
    d. If the user's computer is used for at least part of the computation, at least some of the data is transferred to the program that runs on the user's computer in an encrypted form, and/or the actual vendor identities are not transferred to the user's compute.

34. The method of claim 25 wherein the aggregation services are enabled by at least one of:
    a. The system uses at least one of {Intermediary sites, warehouses, and mail forwarding services}, which are at least one of: branches of the site that runs the system, owned by the site, pay some commission to it, or have other deals with it.
    b. The system works with shipping companies with which it has deals, so that the shipping company itself gives a reduced price to the user based on the fact that the items are collected for shipping together to the same address.

35. The method of claim 22 wherein the system can automatically negotiate a better deal with at least some of the suppliers and/or make reductions automatically according to pre-agreed rules with those vendors.

36. The method of claim 35 wherein at least one of the following features exists:
    a. Said automatic negotiations or automatic reductions are performed at least one of: During the optimization process, and After one or more acceptable solutions have been generated.
    b. Said pre-agreed rules are based on at least one of: 1. Maximum percent or absolute reduction allowed for an entire order, depending at least on the total order amount and/or on the number of items bought, 2. Maximum percent or absolute money reduction defined separately for each item and/or for each group of items, and 3. Maximum reductions in response to reductions available from other vendors.

    c. If one or more reductions from normal listed prices were made, the user can use the reductions by at least one of: 1. If the system relays the relevant parts of the order automatically to the relevant suppliers, then it uses agreed codes to make the sites accept the reduced prices, 2. If the user prefers to make the order directly from one or more of the selected sites, then the system provides the user with the relevant codes.

37. The method of claim 29 wherein the transfer of orders from the system's site to the individual vendors can be done by at least one of:
    a. Keeping a user profile and accessing automatically a shopping cart on behalf of the user on the individual vendor's site.
    b. Billing the user directly and accessing the vendor's shopping cart with the system's site's billing info.
    c. Through one or more special agreed protocols for faster transferring of orders from the system's site to the vendor without having to waste

time on emulating a user clicking on various options or building up a shopping cart and checking out

d. Giving the vendor at least one of: the user's address, the system's address, and the address of an intermediary needed for aggregation.

38. The method claim 23 wherein if an acceptable result is not achieved within the specified time limit, then at least one of:
    a. The system shows the user the current deviation and asks him if he wants to continue the attempts for additional time and/or to increase the maximum allowed deviation and try again, or to accept the result
    b. The system decides automatically or recommends to the user if to continue the attempts for additional time and/or to increase the maximum allowed deviation and try again, or to accept the result.
    c. The system's decision is based on at least one of: The step in the calculation where the time limit has interrupted the process, the distance from the maximum allowed deviation and/or from the lower bound and/or from the upper bound, the number of times the time limit has already been extended, the total time already spent on the calculation, and other statistics and/or heuristics.

39. The method of claim 23 wherein for the actual optimization the system uses at least one of the following steps or methods:
    a. The system checks if there are bigger differences in the item prices or in the shipment prices, in order to decide which heuristics to prefer.
    b. If there are bigger differences in the item prices, the system starts by finding the item on which there is the biggest price difference, and starts from the shop or supplier that sells that item.
    c. The system tries to add to the potential order from the chosen supplier additional requested items ordered by the least difference from the cheapest price on that item from any of the suppliers. The process

adds items from this shop, using the least percent difference criteria and/or least absolute difference criteria, as long as the deviation remains less than the maximum desired deviation or no more items on the user's list are available at the site, or until the list of items has ended.

d. If no more items could be added to the potential order from the chosen shop since the total price would deviate from the lower bound by more than the desired maximum deviation and/or not all items are available from that shop, then the system conducts the same process for adding one or more suppliers for the remaining items, again choosing an item not already chosen with the largest price difference (as above).
e. If any of the suppliers next included has any of the items at a cheaper price than another shop that is already included in the potential order, then the system removes that item from the shop where it is more expensive and adds it to the potential order from the shop where it is cheaper.

f. If the difference in items prices are smaller and the differences in shipments prices are bigger, the system can decide to start the optimization by choosing the shop that has the largest number of the requested items available and/or the shop with the cheapest shipment prices. If all the items are available from that shop and the total price is within the desired maximum deviation then the offer can be shown to the user, otherwise the system tries to add the missing items by adding one or more shops to the potential order.
g. The system tries a comprehensive computation in case all items are bought from 1 shop or divided only between 2 or at most 3 shop and only then reverts to the other heuristics, if still needed
h. The system decides in advance by analysis of the differences in shipment prices compared to the differences in item prices (based on

at least one of the range, variance, and/or other statistics or characteristics), between how many vendors at most the items should be divided.

i. The system uses various heuristics in advance and/or during the computation to rule out from the computation any vendors who would be unreasonable even to check since clearly they will not be able to fit within the acceptable deviation or would violate some other condition.

j. The system decides which heuristics to use depending on various parameters and/or statistics.

k. At each step before deciding which shop to add next to the potential order, the system checks for the remaining items if the differences are bigger in item prices or in shipment prices and proceeds according to the answer.

l. The system always tries first to start from the cheapest item.

m. The system always tries to start from the shop that has the largest number of items and is also the cheapest by one or more criteria.

n. The system uses other heuristics which are based on defining an allowed deviation or deviations from one or more types of theoretical optimum.

o. The system uses column generation heuristics.

p. The system uses other known methods for obtaining near-optimal or acceptable solutions.

40. The method of claim 23 wherein when showing the results the system shows the user also at least one of:

a. A summary of how close a given offer is to at least one of the lower bound and the upper bound.

b. An estimate of how close a given offer it is to the actual optimum.

c. More than one acceptable offer, so that the user can chose among alternatives according to at least one of: The effect of the speed of

shipment on the price, The effect of buying an eBook instead of a printed book, The effect of buying 2nd hand items, The affect of using the aggregation, The effect of using the preferred vendors or not, and Other criteria.

41. The method of claim 22 wherein the user can request that the system will notify him automatically when at least one of: a. One or more items become available at a certain price or below, an out-of stock items becomes available again, c. Some other condition becomes fulfilled.

42. The method of claim 41 wherein in order to find out when the conditions have been fulfilled, the system keeps a list of such requests and of the users who requested them, and then the system can find out when any of these items become available at the requested prices and/or other conditions become fulfilled by at least one of the following ways:
    a. Running periodically special checks for the requested items.
    b. Checking for the relevant items or conditions while updating periodically the prices.
    c. Noticing the relevant items whenever they come up in metasearches conducted by any users.